CLAIMS

1. An insulating film comprising a compound having a borazine skeleton in a molecular structure thereof, and having a specific dielectric constant of no greater than 2.6, a Young's modulus of 5 GPa or greater and a leak current of no greater than 1×10^{-8} A/cm^2.

2. An insulating film according to claim 1,

wherein the insulating film is formed from a borazine-based resin composition with a metal impurity content of no greater than 30 ppm.

3. An electronic part provided with a conductive layer-formed substrate and an interlayer insulating film formed on the substrate,

wherein the interlayer insulating film is composed of an insulating film according to claim 1 or 2.

4. A composite insulating film comprising:

a first insulating film comprising a siloxane resin, and

a second insulating film formed on the first insulating film and comprising a compound having a borazine skeleton in a molecular structure thereof.

5. A composite insulating film according to claim 4,

wherein the first insulating film is composed of a siloxane resin composition comprising a siloxane resin obtained by hydrolytic condensation of a compound represented by the following formula (1):

$$X^1{}_nSiX^2{}_{4-n} \qquad (1)$$

where

X^1 represents an H atom, an F atom, a group containing a B atom,

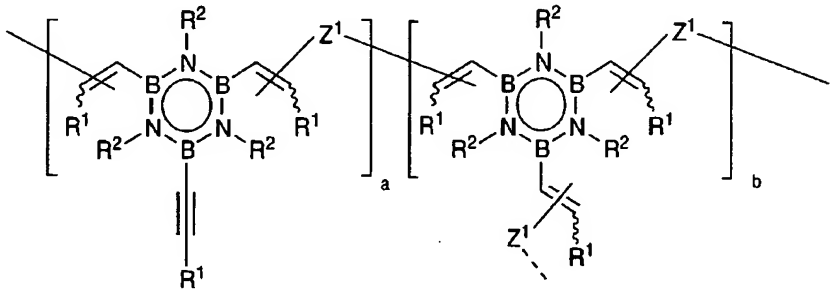
N atom, Al atom, P atom, Si atom, Ge atom or Ti atom, or an organic group of 1 to 20 carbons,

X^2 represents a hydrolyzable group, and

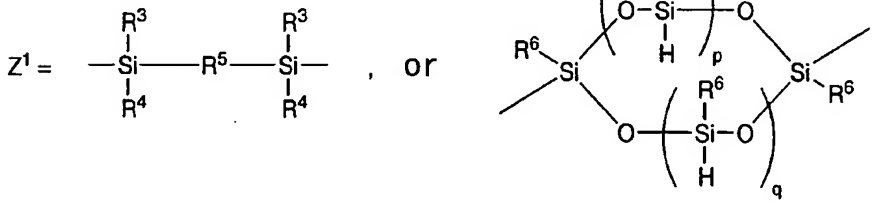
n represents an integer of 0-2, with the proviso that when n is 2, each X^1 may be the same or different, and when n is 0-2, each X^2 may be the same or different.

6. A composite insulating film according to claim 4 or 5,

wherein the compound having a borazine skeleton in a molecular structure thereof has a repeating unit represented by the following formula (2):



(2)



where

R^1 represents alkyl, aryl, aralkyl or hydrogen,

R^2 represents alkyl, aryl, aralkyl or hydrogen,

R^3 and R^4 represent identical or different monovalent groups selected from among alkyl, aryl, aralkyl and hydrogen,

R^5 represents a substituted or unsubstituted aromatic divalent

group, an oxypoly(dimethylsiloxy) group or oxygen,

R^6 represents alkyl, aryl, aralkyl or hydrogen,

a represents a positive integer, b represents 0 or a positive integer, p represents 0 or a positive integer, and q represents 0 or a positive integer.

7. An electronic part provided with a composite insulating film according to any one of claims 4 to 6,

wherein the composite insulating film is formed on a substrate.

8. A process for production of a borazine-based resin that is a polymer having a borazine skeleton on a main chain or a side chain thereof,

wherein the process comprises:

a first step of polymerizing a B,B',B"-trialkynylborazine and a hydrosilane in the presence of a solid catalyst, and

a second step of removing the solid catalyst after completing the first step.

9. A process for production of a borazine-based resin according to claim 8,

wherein the solid catalyst is a supported catalyst comprising a catalyst supported on compound-based carrier.

10. A process for production of a borazine-based resin that is a polymer having a borazine skeleton on a main chain or a side chain thereof,

wherein the process comprises:

a first step of polymerizing a B,B',B"-trialkynylborazine and a hydrosilane in the presence of a metal catalyst in a polymerization

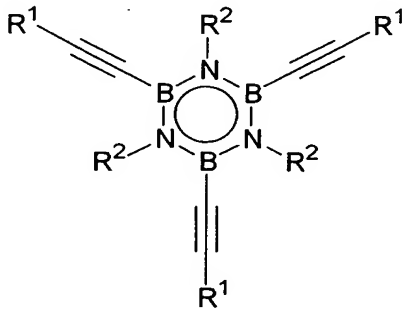
solvent,

a second step of adding to the polymerization system a particulate scavenger which is insoluble in the polymerization system of the first step and adsorbs the metal component from the metal catalyst, after completion of the first step, and

a third step of filtering out the scavenger to which the metal component has been adsorbed after completion of the second step.

11. A process for production of a borazine-based resin according to any one of claims 8 to 10,

wherein the B,B',B"-trialkynylborazine is represented by the following formula (3):



(3)

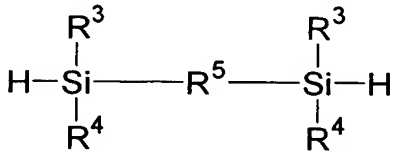
where

R^1 represents alkyl, aryl, aralkyl or hydrogen, and

R^2 represents alkyl, aryl, aralkyl or hydrogen.

12. A process for production of a borazine-based resin according to any one of claims 8 to 10,

wherein the hydrosilane is represented by the following formula (4):



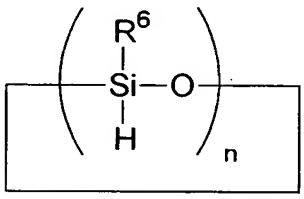
(4)

where

R^3 and R^4 represent identical or different monovalent groups selected from among alkyl, aryl, aralkyl and hydrogen,

R^5 represents a substituted or unsubstituted aromatic divalent group, an oxypoly(dimethylsiloxy) group or oxygen,

or by the following formula (5):



(5)

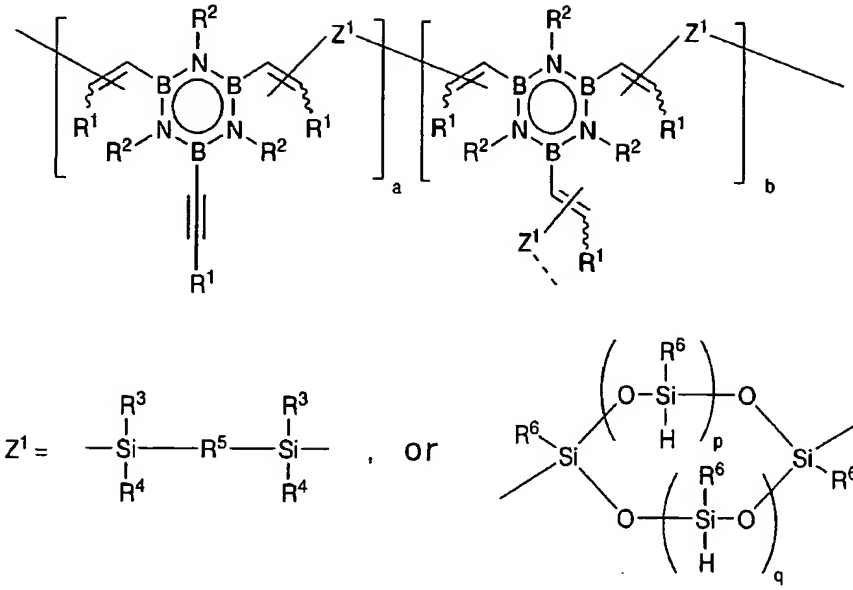
where R^6 represents alkyl, aryl, aralkyl or hydrogen, and n represents an integer of 2 or greater.

13. A borazine-based resin composition comprising a polymer with a borazine skeleton on a main chain or a side chain thereof, and a solvent capable of dissolving the polymer, and having a solid concentration of 0.5 wt% or greater and a metal impurity content of no greater than 30 ppm.

14. A borazine-based resin composition according to claim 13, wherein the polymer is a borazine-based resin produced by a borazine-based resin production process according to any one of claims 8 to 12.

15. A borazine-based resin composition according to claim 13 or 14,

wherein the polymer has a repeating unit represented by the following formula (2):



(2)

where

R^1 represents alkyl, aryl, aralkyl or hydrogen,

R^2 represents alkyl, aryl, aralkyl or hydrogen,

R^3 and R^4 represent identical or different monovalent groups selected from among alkyl, aryl, aralkyl and hydrogen,

R^5 represents a substituted or unsubstituted aromatic divalent group, an oxypoly(dimethylsiloxy) group or oxygen,

R^6 represents alkyl, aryl, aralkyl or hydrogen,

a represents a positive integer, b represents 0 or a positive integer, p represents 0 or a positive integer, and q represents 0 or a positive integer.

16. A method for forming an insulating film on a substrate,

wherein a borazine-based resin composition according to any one of claims 13 to 15 is coated onto the substrate to form a coated film, and the coated film is then dried.

17. An insulating film provided on a substrate, the insulating

film being formed by a method for forming an insulating film according to claim 16.

18. An insulating film according to claim 17,

wherein the insulating film is formed between mutually adjacent conductive layers among a plurality of conductive layers provided on the substrate.

19. An electronic part comprising an insulating film according to claim 17 or 18.

20. A borazine-based resin produced by a borazine-based resin production process according to any one of claims 8 to 12.